6 Channel Scanning Digital Voltmeter/ Thermometer

AD2037/AD2038

PRELIMINARY TECHNICAL DATA

FEATURES

Automatic Scan of 6 Channel Inputs
Manual Selection of Individual Channel
External Channel Selection by BCD Code
±199.9mV or ±1.999V dc Full Scale Range
Isolated Analog Input
Parallel BCD Output
Accessible Gain Points for Implementation of Selectable Gain, to 6V dc F.S.
±12V dc and +5V dc for External Use
AD2038: High Accuracy Temperature Measurements Used with AD590 Transducer
0.1° Resolution; 6 Channels
-55.0°C to +150.0°C (-67.0°F to +199.9°F)

APPLICATIONS

AD2037: Multi-point Measurements for Data Acquisition, Logging and Control
Data Processing from: Pressure and Flow Transducers; RTD and Thermistor Transducers; AD590 Temperature Transducers; LVDT and Level Transducers; Voltage and Current Sources.

AD2038: Temperature Monitoring in Laboratory, Manufacturing, and Quality Control

AD2037 GENERAL DESCRIPTION

The AD2037 is a low cost 3 1/2 digit, ac line powered, 6 channel digital scanning voltmeter designed to interface to printers, computers, serial data transmitters, telephone lines, etc., for display, control, logging or transmission of multi-channel analog data. With appropriate external signal conditioning on each channel, the AD2037 becomes a versatile building block for a broad range of data acquisition, data logging, or control applications.

Channel selection is made via three methods: manual, using the switch provided on the front; Auto/Scan, where the AD2037 cycling on an internal clock can continually scan the 6 input channels; or External selection, where control inputs provided on the rear connector enables channel selection via external BCD code.

A separate channel select output identifies the selected channel independent of selection mode. The channel select output together with converted BCD output provides complete information for automatic data collection. For applications where there are high common mode voltages (CMV) present, the

AD2037 has as a standard feature, a floating opto isolated analog front end that will withstand CMV's up to 250V rms. The ±199.9mV full scale range or ±1.999V dc full scale range are user selectable via a jumper on the rear connector. Other full scale ranges, to 5V dc, are programmable, via one (1) external resistor.

AD2038 GENERAL DESCRIPTION

The AD2038 is a dedicated 6 channel digital scanning thermometer. Based on the AD2037 and designed to be used in conjunction with Analog Devices' AD590 Temperature Transducer, the AD2038 retains all of the input/output features of the AD2037 as well as the channel selection methods.

The AD2038 and AD590 will measure and display temperatures to ±1.3°C accuracy over the temperature range of -55.0°C to +150.0°C (-67.0°F to 200.0°F), over limited temperature ranges around a calibration point, accuracies approach a few tenths of a degree.

The AD590 is a laser trimmed, two terminal IC Temperature Sensor. Its output is a current (1μA per °K) linearly proportional to absolute temperature thus eliminating the need for

(continued on page 3)

P.O. Box 280; Norwood, Massachusetts 02062 U.S.A.
Telex: 924491 Cables: ANALOG NORWOODMASS

SPECIFICATIONS (typical @ +25°C and nominal power supply voltage)

DISPLAY OUTPUT
- Light emitting diode (LED), seven segment display readouts, 0.5″ (13mm) high for 3 data digits, 100% overrange and polarity indication. Overload indicated by flashing display, polarity remains valid. There is no indication of out of sensor range on AD2038.
- Decimal Points (3) Selectable at Input Connector
- Display Blanking
- Sensor Disconnect Indication same as overload.

ANALOG INPUT
- Opto/Transformer Isolated
- Configuration: Differential, isolated
- ±1.999V dc and ±199.9mV dc Full Scale Range
- Full Scale Range Programmable to 6V dc
- Input Impedance: 250MΩ
- Bias Current: 1.5nA
- Overvoltage Protection: (Continuous Without Damage)
  Normal Mode: ±30V pk
  Channel to Channel: ±30V pk

ACCURACY
AD2037
- ±0.05% Reading ±1 digit[1]
- Resolution: Programmable
- Temperature Range: 0 to +50°C operating; −25°C to +85°C storage
- Temperature Coefficient: Gain: 50ppm/°C
  Zero: 1.5μV/°C
- Warm-up Time to Rated Accuracy: Less than 5 minutes
- Settling Time to Rated Accuracy: 0.6 seconds (– full scale to + full scale)
- Max Voltage Between Channels: ±199.9mV FS; ±6.1V pk
  ±1.999V FS; ±2.5V pk

ACCURACY
AD2038
- Resolution 0.1°
- Range −55°C to +150°C
  −67°F to +200°F
- Accuracy: (±0.1° digitizing error)[2]

	AD590J	AD590K	AD590L
Sensor calibrated at +25°C (over range)	±2.2°C max	±1.2°C max	±1.2°C max
Uncalibrated Error at +25°C	±5.2°C max	±2.2°C max	±1.2°C max
Uncalibrated Error (over range)	±9.7°C max	±4.0°C max	±2.6°C max
Nonlinearity (over range)	±2.0°C max	±0.5°C max	±0.5°C max

- Temperature Coefficient: Span: 50ppm/°C
  Offset: 0.01 degrees/degree

NORMAL MODE REJECTION
- 50dB at 50 – 60Hz (Additional capacitor filtering may be added between pins A and 4 with degradation of response time)

COMMON MODE REJECTION
- Floated on Power Supply: 120dB at 250V rms max CMV, dV_{cm}/dt 10^6 V/sec max, 1kΩ Imbalance

CONVERSION RATE
- 5 Conversion/sec
- Hold and Read on Command

POWER INPUT
- AC Line 50 - 400Hz, see Voltage Options Below
- Power Consumption - 5.8W @ 50 - 400Hz

ANALOG OUTPUTS
- ±12V dc ±10% @ 10mA (Referenced to Isolation Analog Grd.)
- +5V dc ±5% @ 30mA
- Reference Voltage +6.4V ±1% (Referred to Analog Grd.) 25ppm/°C @ 50μA max output

DATA OUTPUTS
Isolated Parallel BCD Outputs - 3 BCD digits, overrange, overload outputs (TTL Compatible, 4 TTL Loads). BCD data outputs are latched positive true logic. Overload output is Logic "0" for inputs greater than full scale range, Logic "1" when other data outputs are valid. Polarity output (TTL compatible, 4 TTL Loads latched) indicates positive polarity when high (Logic "1"). Digital outputs are fully isolated from input circuitry; all Logic levels reference to digital ground.

Channel Address Outputs (CMOS/TTL Compatible 2 TTL Loads) - BCD Channel number data outputs are positive true.

Mode Output (CMOS/TTL Compatible 2 TTL Loads) - Logic "1" indicates channel selection is by switch. Logic "0" indicates selection is by scanner or external control, useful in Microcomputer Interface.

Data Ready (Data Ready) CMOS/TTL Compatible 2 TTL Loads) - Logic "1" ("0") indicates data from Scan Card is ready. Data remains valid until next clock pulse.

Spare Inverter Output (CMOS/TTL Compatible 2 TTL Loads) - Spare inverter supplied for customer convenience.

Clock Out (CMOS/TTL Compatible, 2 TTL Loads) - Indicates EOC. When clock pulse is high, latches are being updated, data is invalid. Data is valid on negative going edge for 198ms. Clock Out pulse is disabled when Data Hold line is low.

ANALOG OUTPUT (P2 Pin A): 1mA max output

AD2037: $V_O = K V_{IN}$
Where K is gain of programmable input amplifier. (K = 1 for 1.999V F.S. and K = 10 for 199.9mV)

AD2038: $V_O = (18.95mV/°C)T$ for T = °C
$V_O = (10.53mV/°F)(T-32)$ for T = °F
error = ±6mV

CONTROL INPUTS

Display Blanking (TTL Compatible, 3 LSTTL Load) - Logic "0" or grounding blanks entire display except for decimal points; Logic "1" or open circuit for normal operation. Display blanking has no effect on output data. Display is valid immediately upon removal of blanking input.

Converter Hold (CMOS/TTL Compatible, 1 LSTTL Load) - Logic "0" or grounding causes DPM to cease conversions and display data from last conversion; Logic "1" or open circuit for normal operation. After "Converter Hold" is removed, one or two conversions are needed before reading and BCD are valid.

Decimal Points (Not TTL Compatible) - Logic "0" or grounding illuminates desired decimal point. External drive circuitry must sink 35mA peak at a 25% duty cycle, when decimal point is illuminated.

Data Hold (TTL Compatible, 1 TTL Load) - Logic "0" inhibits updating of latched parallel output data. Logic "1" or open circuit allows data to be updated after each DPM conversion. This input has no effect on normal conversion of the DPM and its display.

Scanner Enable (CMOS/TTL Compatible 1 LSTTL Load) - Logic "1" will enable Scanner to control the channel selection. External channel input BCD lines can remain connected. A Logic "0" enables external channel selection.

Scan ($\overline{\text{Scan}}$)(CMOS/TTL Compatible, 1 LSTTL Load) - A Logic "1" ("0") for <4 seconds will initiate a scan of six channels. To use $\overline{\text{Scan}}$ input, the Scan input must be a Logic "0". Both inputs have debounce circuitry. A momentary scan pulse while in the switch or external mode will initiate a sequence of six readings of the channel that is addressed then stop.

Channel Address Input (CMOS/TTL Compatible 1 LSTTL Load) - Logic "0" on Scanner Enable will allow use of external control. All other control inputs remain the same.

Channel Address Increment (CMOS/TTL Compatible 1 LSTTL Load) - Positive going edge will initiate sequence to the next channel.

Spare Inverter Input (CMOS/TTL Compatible 1 LSTTL Load) - Spare inverter supplied for customer convenience.

CALIBRATION ADJUSTMENTS
- Gain
- Offset, Course
- Offset, Fine
- Span/per Channel (AD2038 only)
- Recommended Recalibration Interval: Six Months

SIZE
- 3.92″ x 1.67″H x 5.80″D (100 x 42 x 147mm)
- Panel Cutout 3.930″ x 1.682″ (99.8 x 42.7mm)

WEIGHT
- 1.25 pounds (0.563 kg)

OPTIONS[3]
AD2037 Lens: 28 Red with ADI Logo
Lens: 27 Red without ADI Logo

AD2038 Lens 22-1, Red °C with ADI Logo
Lens 22-2, Red °F with ADI Logo
Lens 23-1, Red °C without ADI Logo
Lens 23-2, Red °F without ADI Logo

CONNECTORS (2)
2 each, 30 pin, 0.156″ Spacing Card Edge Connector
Viking 2Vk 15/1-2 or Equivalent
Optional: Order AC1501

ORDERING GUIDE
AD2037 or AD2038 - □ □ □

POWER INPUT[4]
117V ac ±10% 1
220V ac ±10% 2
100V ac ±10% 3
240V ac ±10% 4
} Enter

SCAN RATE[4]
3.2 sec 1
1.6 sec 2
0.8 sec 3
} Enter

TEMPERATURE SCALE READOUT (AD2038 Only)[4]
°C 1
°F 2
} Enter

Notes:
[1] Guaranteed at 200mV full scale at +25°C and nominal power supply.
[2] Overall accuracy of meter plus sensor over entire sensor range (guaranteed max) Meter is factory calibrated for ideal sensor.
[3] Lens 22 (AD2038) Lens 28 (AD2037) supplied if no lens option is specificed.
[4] Only one option may be specified.
[5] Options not listed are no charge.

Specifications subject to change without notice.

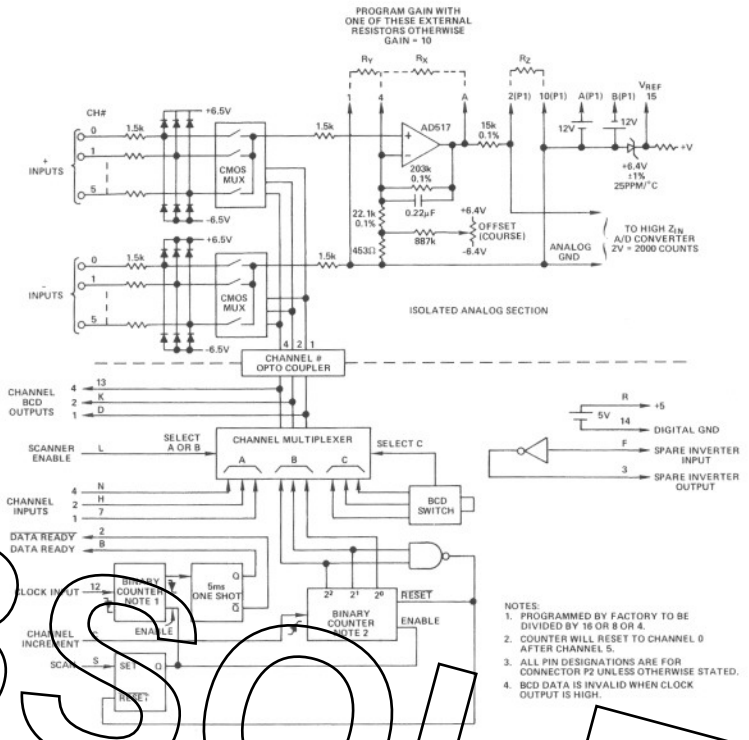


Figure 1. AD2037 Block Diagram

linearization and cold junction compensation. Just connect the sensors to the rear terminal block, calibrate them if necessary, and the AD2038 is ready to make measurements.

Due to the AD590's high impedance current output, it is insensitive to voltage drops over long lines thus enabling remote monitoring with no need for costly transmitters or special wire.

For normal applications the AD590J can be used and calibrated at a single temperature point. Where better linearity or sensor interchangeability is needed, the "K" and "L" versions are available. All versions are available to MIL-STD-883A Class B processing. In addition, the AC2626 (an AD590JF mounted in a 3/16 inch diameter, by 6 inch long stainless steel probe) will soon be available. The probe will be supplied with 3 feet of wire for easy interface to the AD2038.

AUTO/SCAN

The AD2037/38 while in the Auto/Scan mode, will permit unattended scanning of all six input channels. The rate of the channel select is 3.2 seconds, 1.6 seconds or 0.8 seconds per channel. The AD2037 or AD2038 can be used as a stand-alone instrument and with the Scan input held high will continually scan six channels. When the Scan input is brought low the AD2037/38 will continue to cycle and stop at Channel "0".

MANUAL CHANNEL SELECTION

A switch on the front enables the user to manually select an individual channel input. As in the Auto/Scan mode, the BCD output of the selected channel and the channel number are available. Selection of an individual channel automatically disables scan and external channel selection is overridden. The Mode Output pin indicates when the switch is in this condition. On special order, meters can be supplied with card edge control for disabling the switch.

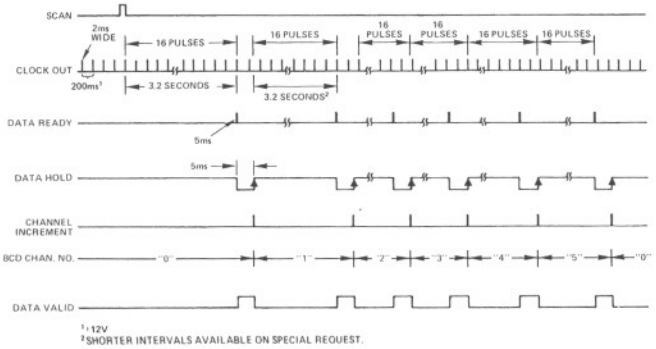


Figure 2. Scan Timing Diagram

EXTERNAL CHANNEL SELECTION

For remote control of channel selection, the AD2037/38 provides inputs for an external BCD code selection. This feature allows external switch, microprocessor or computer control.

CIRCUIT DESCRIPTION, AD2037

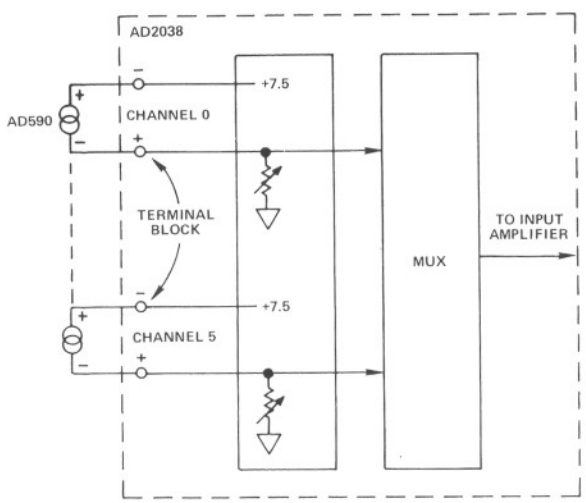
The AD2037 Block Diagram is shown in Figure 1. Channel selection is made by the CMOS Multiplexer which is comprised of two sets of six switches. The output of the multiplexer is on two lines. One is connected to Analog Ground, the other is fed into an amplifier, where the Gain, when desirable, is selectable. The AD2037 is supplied from the factory with all Gain Points open and Gain equal to 10 (ten) for 199.9mV Full Scale. The 1.999V dc Full Scale (VFS) setting is accomplished via a jumper from Pin A to Pin 4 of P2. To select Full Scales less than 199.9mV (Gain >10) place a resistor, computed from formula in Table 1, between Pins 1 and 4 of P2. Similarly for Full Scale settings greater than 1.999V place the resistor between Pins 10 and 2 of P1 and jumper Pin A to Pin 4 of P2. In each case the signal is then filtered and processed by the Analog to Digital Converter. The converter drives the Display and the Parallel BCD Output.

FULL SCALE RANGE	
Less than 200mV	$R_y = \frac{203K}{\left(\frac{2}{VFS}\right) - 10}$
200mV to 2 Volts	$R_x = \frac{203K\ (2 - VFS)}{10VFS - 2}$
2 Volts to 6 Volts	$R_z = \frac{30K}{(VFS - 2)}$

Table 1.

CIRCUIT DESCRIPTION, AD2038

The AD2038 simplified Block Diagram is shown in Figure 3. The AD2037 together with a dedicated signal conditioning card, make up the AD2038. The selected sensor will transmit a current to the AD2038. The signal conditioning card converts the current from the appropriate AD590 to a voltage which is then measured and displayed. AD590 connection is accomplished at the terminal block on the rear.



NOTE: ATTACH SENSOR POLARITY INVERSELY TO THE METER, + OF SENSOR TO CHANNEL - INPUT; - OF SENSOR TO CHANNEL + INPUT.

Figure 3. AD2038 Diagram

CHANNEL SELECTION

As shown in Figure 1, Channel Selection is obtained by one of the three methods via the Channel Multiplexer. In method A, Channel selection is under external BCD logic control, in Method B, control is via the digital scanning circuitry. In Method C control is by the Front Panel Switch.

The method of channel selection is under control of the Scanner Enable input. A logic low enables external BCD logic control (Method A). A logic high enables internal scanning circuitry selection (Method B). In standard units, Front Panel switch selection (Method C) overrides selection by Methods A or B.

On special order, units can be wired for card edge enable/disable control of the switch.

The three methods allow the user to select his mode of operations: (See Figures 4 and 5).

- Continuous scan of 6 Channels
- Single scan of 6 Channels
- Continuous scan of an individual Channel
- Single scan of an individual Channel
- Individual Channel selection

SCAN TIMING

As shown in the Timing Diagram of Figure 2, a Channel Scan is initiated by a logic high on the Scan input (pin S). The conclusion of the previous scan cycle will have resulted in Channel "0" already being selected. Conversions take place 5 times per second but 3.2 seconds are allowed to elapse before the Data Ready output indicates the data is valid. 0.6 seconds is required for worst case settling time of a full span step change as could take place in switching channels. Where conditions do not warrant the 3.2 second delay, units can be provided with Data Ready occurring after 1.6 seconds or 0.8 seconds.

In the standard unit, the Data Ready line switches high 16 clock pulses after Scan initiation (approximately 3.2 seconds). The Data Hold input can then be switched low if it is desired to retain the data unchanged for more than the minimum interval of 198ms. Upon releasing the Hold, it is necessary to produce a positive going pulse change on the Channel Increment input in order to step the Channel Selection. In many cases the Data Hold and Channel Increment inputs can be tied together so that release of the Hold will automatically step the Channel Selection.

In this fashion (and as shown in Figure 2) a complete cycle of the six channels can be obtained with the AD2037/38 stopping on Channel "0" and awaiting another Scan input pulse to signal the start of another cycle.

OPERATION WITH PRINTER

Input and output connections for operating with a printer are shown in Figure 4. A scan of the channels is initiated via push *button* or other pulse source. When Data Ready goes high, $\overline{\text{Busy}}$ output from the printer goes low. This "holds" the Data and Channel Number Outputs until the printer raises the $\overline{\text{Busy}}$. When $\overline{\text{Busy}}$ goes high the "hold" is released and the channel counter is incremented. After 3.2 seconds (in the standard unit), the Data Ready again goes high and the interlocking of signals repeat 5 times until data has been printed for all six channels. Each automatic or manual initiation of the scan causes the sequence to repeat.

To continuously scan all six channels with a printer, set up as in Figure 4 except $\overline{\text{Scan}}$ must be held at Logic "0".

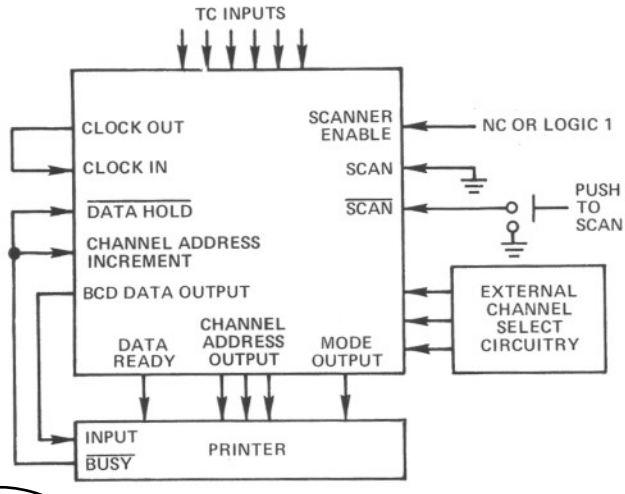


Figure 4. Operation with Printer

For continuous printing of a single channel set up as in Figure 4 except fix Scan at Logic "0". Channel can be selected by Front Panel switch or externally.

For external Channel Selection, the Scanner Enable line should be held low. Under external BCD control, Channel Selection occurs immediately. If the Scan line is pulsed to a logic low, the printer will print the selected channel data 6 times and stop. If held low, a continuous printout of the selected channel will result. +5V power is provided at the rear connector to power external control logic.

STAND-ALONE OPERATION

The AD2037/AD2038 can at any time, under Front Panel switch control, be operated so as to allow examination of individual channels. When used as a stand-alone instrument, it may also be desirable to initiate a single scan of all six inputs. Figure 5 shows the necessary interconnections to obtain this operation. As before, the cycle is initiated via a pulse from a

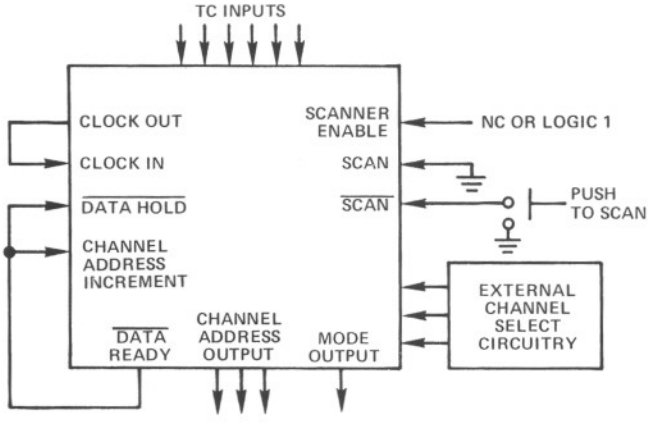


Figure 5. Stand-Alone Operation

push button or other source. In this case, however, the Data Hold and Channel Address Increment inputs are controlled by the Data Ready. Each time Data Ready goes from low to high, the channel is incremented and conversions are made on the newly selected channel. The process continues until the meter is back on Channel "0". The meter then waits for another scan initiation. During a scan each channel is displayed for 3.2 seconds (the whole scan takes approximately 20 seconds). Simultaneous display of channel number and converted value requires implementation of a separate display for channel number (see Figure 11).

To continuously scan, set up as per Figure 5 except fix the Scan input at Logic "0".

AD2037 CALIBRATION PROCEDURE

A precision voltage reference is needed for the calibration of the AD2037. The location of the calibration potentiometers is shown in Figure 14.

Offset adjustment – with Front Panel switch on Channel "0", short Channel "0" input and adjust offset potentiometer until the meter reads 000.

Gain adjustment – remove jumper from Channel "0" and apply an input of 0.9 times the programmed Full Scale Voltage. Vary gain adjust potentiometer until the meter reads 1800 exactly.

AD2038 CALIBRATION PROCEDURE

The AD2038 is factory calibrated in either °C or °F using an ideal sensor, and can be used directly if sensor accuracy is adequate. For maximum accuracy with any grade sensor, the calibration procedure is as follows:

Initial Calibration:

1. Attach sensors to Channel inputs. Polarity of the sensor must be connected inversely to the meter, + of sensor to Channel – input; – of sensor to Channel + input.
2. Set Front Panel Switch to Channel "0".
3. With sensor at a known temperature adjust the appropriate Span Adjust potentiometer on the rear (See Figure 14) for a reading on the AD2038 equal to the temperature.
4. Repeat step 3 for each sensor on each Channel making sure to turn Front Panel Switch to the appropriate Channel.

6 Month Calibration °C (°F)

A 4 1/2 Digit precision DVM and a resistance decade box are needed. The location of the calibration potentiometers are shown in Figure 14.

1. Set Front Panel Switch on Channel "Zero."
2. With sensor disconnected adjust Course Offset pot on the front for V_A = (between Pin A and Pin 1 of P2) = –5.1764 Volts.
3. Attach resistance decade box to sensor input (Channel "0").
4. Adjust resistance box until V_A = 0.000V (–0.3368V).
5. Adjust Fine Offset Adjust until the meter reading = 00.0.
6. Adjust resistance box until V_A = +3.6000V (+1.6632V).
7. Adjust Gain Adjust on the front until the meter reading = +190.0.
8. Attach AD590 Sensors. Polarity of the sensor must be connected inversely to the meter, + of sensor to Channel

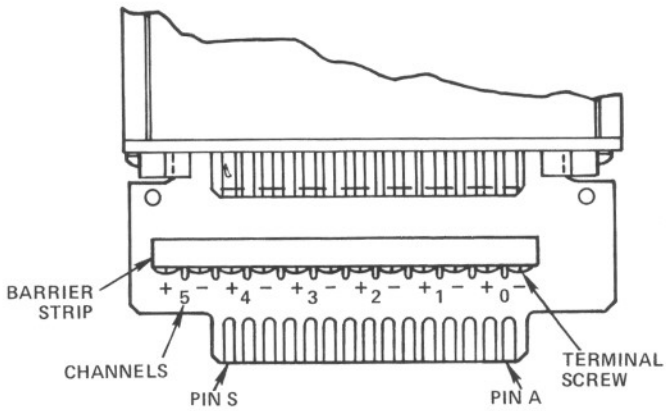
– Input; – of sensor to Channel + Input.

9. With sensors at a known temperature (Front Panel Switch still on Channel "0"), adjust the appropriate Span Adjust on the rear for that temperature readout on the AD2038.
10. Repeat step 9 for each sensor on each Channel making sure to turn Front Panel Switch to the appropriate Channel.

WIRING CONNECTIONS

All connections are accessible at the read. All but the signal input connections are via card edge (see Figures 7 and 8). Signal Inputs are connected to a terminal block on the top board (see Figure 6).

Power connections, control inputs and digital connections are contained in the pin out diagrams in Figures 7 and 8.



BOTTOM VIEW
P2

Figure 6.

PIN REF	PIN FUNCTION
1	DATA HOLD
2	PROGRAMMABLE GAIN
3	CLOCK OUT
4	POLARITY
5	BCD 8
6	BCD 2
7	BCD 80
8	BCD 20
9	BCD 800
10	ANALOG GROUND
11	BCD 400
12	BCD 200
13	DISPLAY BLANK
14	OVERRANGE
15	AC LINE HIGH

KEY

PIN REF	PIN FUNCTION
A	+12V dc (REF. TO ANALOG GRD)
B	–12V dc (REF. TO ANALOG GRD)
C	OVERLOAD
D	CONVERTER HOLD
E	BCD 1
F	BCD 4
H	BCD 10
J	BCD 40
K	BCD 100
L	DP3 XX.X
M	DP2 X.XX
N	DIGITAL GROUND
P	DP1 XXX
R	SHIELD (EARTH GROUND)
S	AC LINE LOW

Figure 7. Converter Card Pin Designations, P1

KEY

PIN REF	PIN FUNCTION
1	ANALOG GND
2	DATA READY
3	SPARE INVERTER OUTPUT
4	SELECTABLE GAIN AND OFFSET
5	FACTORY USE
6	MODE OUTPUT
7	CHANNEL ADDRESS INPUT BCD 1
8	NC
9	NC
10	NC
11	NC
12	CLOCK IN
13	CHANNEL ADDRESS OUTPUT BCD 4
14	DIGITAL GND
15	V_{REF}

KEY

PIN REF	PIN FUNCTION
A	ANALOG OUTPUT
B	DATA READY
C	CHANNEL ADDRESS INCREMENT
D	CHANNEL ADDRESS OUTPUT BCD 1
E	FACTORY USE
F	SPARE INVERTER INPUT
H	CHANNEL ADDRESS INPUT BCD 2
J	RESERVED FOR FUTURE FUNCTION
K	CHANNEL ADDRESS OUTPUT BCD 2
L	SCANNER ENABLE
M	RESERVED FOR FUTURE FUNCTION
N	CHANNEL ADDRESS INPUT BCD 4
P	SCAN
R	+5V dc (REF. TO DIG. GRD)
S	SCAN

Figure 8. P2

PRESSURE METER

The pressure meter shown in Figure 9 is programmed for 0 - 100.0 PSI. The Programmable Gain and Offset features allow readout in any engineering units.

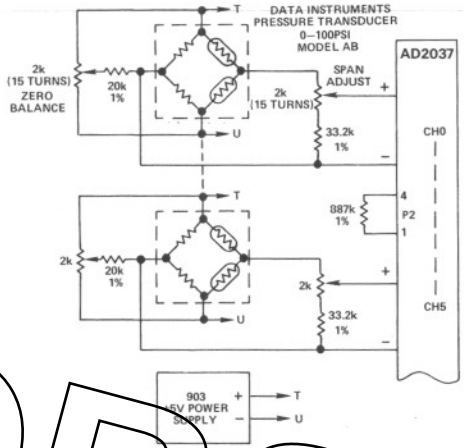


Figure 9. Pressure Meter

The signal voltage appearing across the output leads of the transducer is both a function of the applied pressure and the excitation voltage. At no load, a small residual output voltage will be present. This voltage can be nulled out using the Zero Balance potentiometer. Transducer span inaccuracies are calibrated via the Span Adjust potentiometer. The differential, isolated front end of the AD2037 rejects the 2.5V CMV of the strain gauge. At no time should the Analog Ground be connected to any portion of the pressure transducer circuitry.

RTD THERMOMETER

Figure 10 shows a 3 wire, 0.1° resolution, nonlinearized RTD circuit. For many applications where repeatability is required linearization is not necessary. The transistor, resistor (R1) and potentiometer on each Channel form a 1.5mA current source.

This current through the RTD resistive element is converted to a voltage which is proportional to absolute temperature and measured by the AD2037. Conversion from absolute temperature to °C or °F requires on offset which is produced by the reference of the AD2037 and R_O.

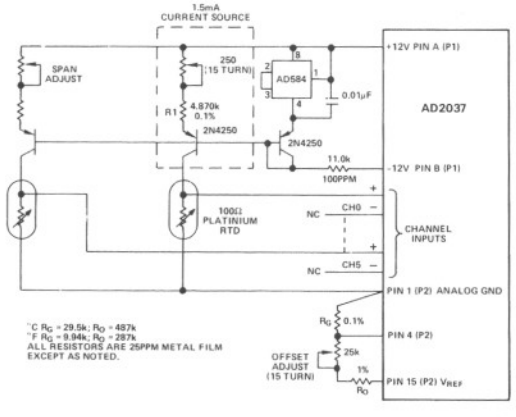


Figure 10. RTD Thermometer

NOTE: More detailed applications assistance available from factory.

REMOTE CHANNEL INDICATOR

The Channel number is displayed on a three tenth inch (0.3″) high efficiency, common cathode Hewlett Packard Display. The Channel BCD output feeds a seven segment decoder driver which in turn drives the LED. Power is supplied from Pin R (+5V) on P2.

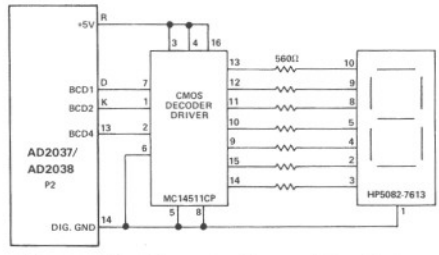


Figure 11. Remote Channel Indicator

LINEAR THERMISTOR THERMOMETER

For applications where the user is committed to or desires thermistor type sensors, the AD2037 is easily interfaced. The Linear Thermistor Thermometer, shown in Figure 12, uses the YSI42201. Linear Thermistors are available in various type probes for many medical, scientific and industrial applications.

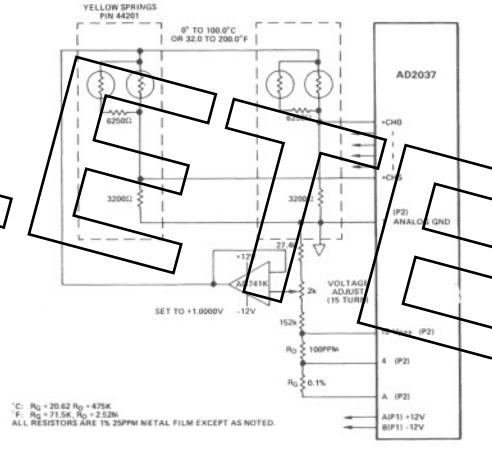


Figure 12. Linear Thermistor Thermometer

PROCESS MONITOR

As shown in Figure 13, the AD2037 provides scanning and digital readout for six (6) standard 4-20mA current loops. The AD2037 is programmed for 0-100.0% Readout. Other readout ranges can be accommodated by changing the Gain and Offset programming resistors.

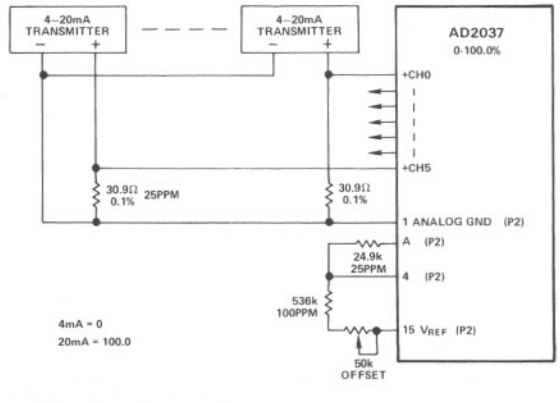


Figure 13. Process Monitor

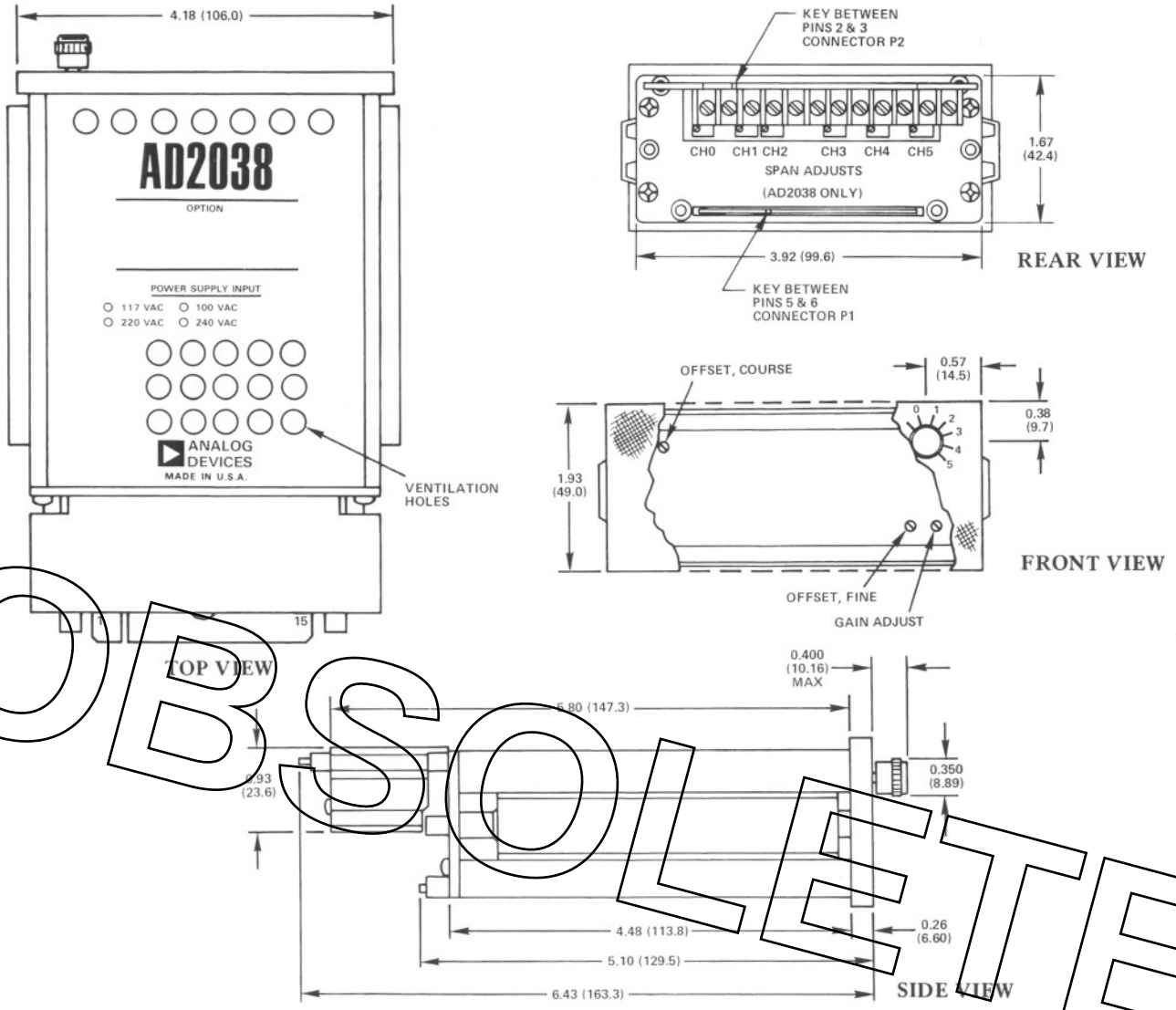
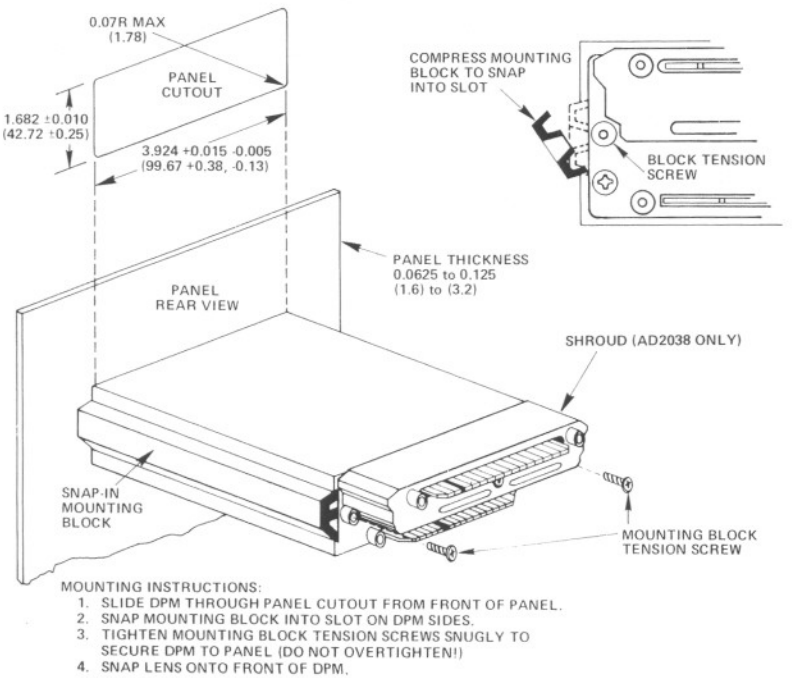


Figure 14. AD2037/38 Mechanical Outline
(Dimensions shown in inches and (mm))



MOUNTING INSTRUCTIONS:
1. SLIDE DPM THROUGH PANEL CUTOUT FROM FRONT OF PANEL.
2. SNAP MOUNTING BLOCK INTO SLOT ON DPM SIDES.
3. TIGHTEN MOUNTING BLOCK TENSION SCREWS SNUGLY TO SECURE DPM TO PANEL (DO NOT OVERTIGHTEN!)
4. SNAP LENS ONTO FRONT OF DPM.

Figure 15. AD2037/38 Mounting Instructions
(Dimensions shown in inches and (mm))

C481–8–8/78

PRINTED IN U.S.A.